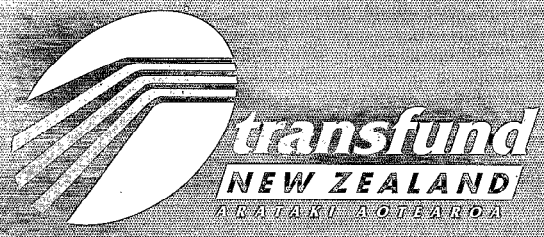

TRANSFUND NEW ZEALAND

1998 Pilot Safety Audit of Traffic Control at Road Work Sites: Summary Report

Review and Audit Division

Report No. RA98/699S

Report No. RA98/699S 600-06-05

TRANSFUND NEW ZEALAND

1998 Pilot Safety Audit of Traffic Control at Road Work Sites: Summary Report

Prepared By .....

John Boyson, *John Boyson Consulting Services Ltd*

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Approved By .....

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February 1999

TRANSFUND NEW ZEALAND

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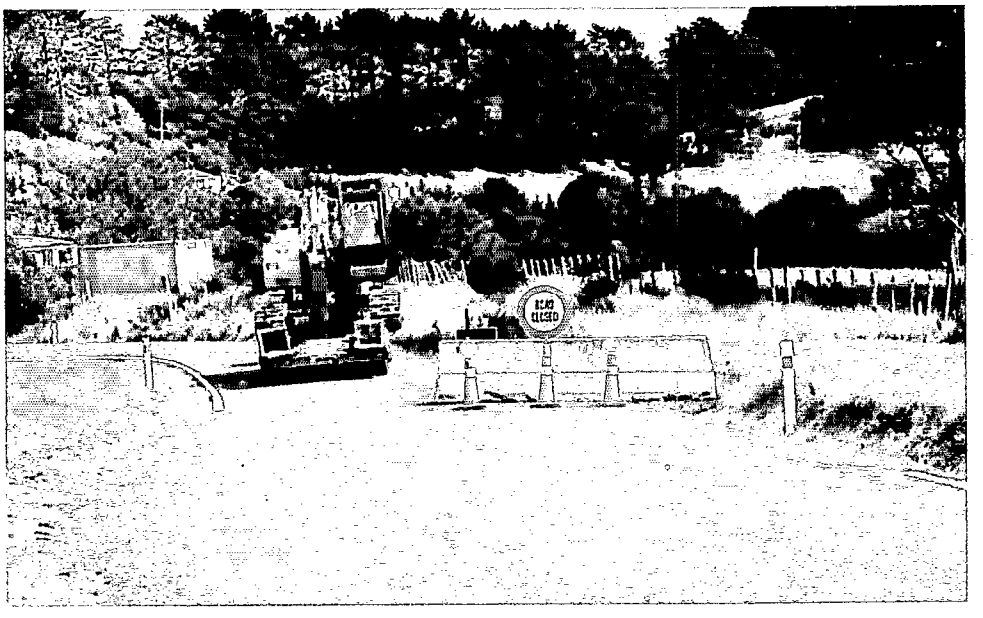

Road closed with a concrete barrier placed at 90 degrees to road.

Review and Audit Division

Report No. RA98/699S

Contents

Appendices

Foreword

This report summarises the main findings of two pilot safety audits of the temporary traffic control at roadwork sites. These audits are a continuation of the work initiated by Transfund New Zealand. That work was reported in Transfund report no.RA96/562S. An audit methodology, including a rating system, was proposed.

Transfund engaged John Boyson (John Boyson Consulting Services Ltd) and Jeff Kaye (Opus International Consultants Ltd) to lead two pilot safety audit teams with a view to testing and refining the proposed audit methodology. Capital Training Ltd and the Land Transport Safety Authority (LTSA) were represented on both teams.

Transfund ensured that this work was complementary to two parallel pieces of work. These were:-

1 The LTSA conducts "Theme Audits" annually. In its 1998 series the LTSA chose to look at traffic control at roadwork sites. The main purpose of the LTSA survey was to review the systems used by road controlling authorities for managing traffic control at road works. Nevertheless the LTSA engineers did use the methodology developed for Transfund to review the overall performance at a sample road work sites.

2 Transit New Zealand has convened a working party to review the existing documents on traffic control at road work sites and to develop a single document. Transit has released a draft for public comment in December 1998. Transfund provided the working party with the draft reports of the site inspections plus copies of the videos.

This summary report outlines the extent of compliance with current good practice and assesses the relative importance of the non compliance observed. However, one of the purposes of these pilot audits was to test and further develop the audit methodology. A companion report has been prepared which sets out the safety audit procedure. Transfund intends to issue the audit procedure as a draft for anyone to use for his or her own purposes.

The findings, opinions and recommendations in the report are based on an examination of a sample only, and may not address all issues existing at the time of the audit. So readers are urged to seek specific advice on particular matters and not rely solely on the report.

The opinions expressed within the Executive Summary and Sections 8.1 and 10 of this report are those of the author and do not necessarily represent those of Transfund New Zealand.

While every effort has been made to ensure the accuracy of the report, it is made available strictly on the basis that anyone relying on it does so at his/her own risk without any liability to Transfund New Zealand.

Transfund intends to promulgate both the findings of the pilot audits and the interim safety audit procedures to the industry in the first half of 1999. Any enquiries should be directed to:

Ian Appleton (Dr), Safety Audit Manager, Transfund New Zealand, P O Box 2331, Wellington, New Zealand. Email: ian.appleton@transfund.govt.nz

23 February 1999

Executive Summary

These audits were commissioned by Transfund New Zealand followed a pilot audit conducted by Capital Training Ltd on 29 January 1997 (Refer to Transfund Audit Report No.RA96/562S). The sites were assessed using a formula system to determine the site danger factor.

The purposes of the Audits were twofold.

- Firstly, it was used to further develop the methodology first trialled in the pilot audit using different personnel to give a greater range of feedback on the system being developed.
- Secondly, it provided a greater coverage of New Zealand thus allowing more data to be collected. This gave the opportunity to more accurately determine the extent and nature of the problems identified during the pilot audit.

The purpose of this report is to summarise the findings of the two surveys detailed and offer solutions based upon the author's knowledge of the industry. Transfund New Zealand does not necessarily agree with these opinions. No reference to any of the parties involved is made.

Each audit involved 4 people in an unmarked vehicle driven in the manner of a normal road user observing sites from all possible approaches. These sites were selected by simply driving along roads at random (albeit with a particular destination in mind at the end of the day) and observing any sites that the team encountered en route.

Additionally, the sites were recorded on video as a permanent record.

Deficiencies were recorded and a 'site danger factor' calculation was performed for each site. The result of this calculation was derived from a multiple of the traffic volume on the road on which the site was located, the effect of that site on the traffic and the extent of the non compliance, if any.

With regard to the methodology it is important to note that it is still under development and as such any of the results derived from it should be treated with caution at this stage. They should only be considered as indicators of a site's condition and not absolute numbers.

The 'site danger factor' calculation procedure used throughout this report has now been superseded by the 'site hazard rating' procedure which was developed as a result of the findings of the audits covered by this report.

The audit was conducted in two separate components as follows:

South Island: Northern Canterbury

Date: 5 and 6 March 1998

A total of **31** road work sites were audited. Some **12** sites were found to have an site danger factor in excess of **2000** which is the cut off level for the worst case category: **'DANGEROUS'**. The suggested corrective action for this category is to stop work and immediately make the site safe.

North Island: North Auckland

Date: 23 and 24 March 1998

A total of **28** road work sites were audited. Some **17** sites were found to have an site danger factor in excess of **2000**.

General Conclusions

To give an indication of the level of non compliance the summary data comparisons are tabled below:

	North Island	**South Island**
Highest Site Danger Factor (State Highway)	13,800	2,000
Highest Site Danger Factor (Local Road)	14,800	6,700
Average Site Danger Factor	3,650	1,877

Not one site was found to be in a **'SAFE'** condition as defined by the categories (see Conclusions).

The average site danger factor for the South Island survey was located at the top end of the **SERIOUS** category. The North Island survey results were even worse where the average site danger factor was well above the cut off level for the **DANGEROUS** category.

Given the level and spread of non compliance, the author of the report recommends that Transfund New Zealand should become involved in the current Transit New Zealand review of their current standards for temporary traffic control at roadwork sites. It is understood that Transit is intending that the manual will provide varying levels of control standards based upon traffic speeds and volumes. This is with the intention that the standard would be available for other Road Controlling Authorities if they so wished.

The involvement of Transfund would allow the standard to have national recognition suitable for all organisations involved in road works activities in New Zealand. Additionally as the significant funding organisation, Transfund would provide a balance in terms of the cost level it is prepared to pay in order to safely control traffic through road work sites.

In conjunction with this, there should also be a formalised process to educate and audit all parties involved with temporary traffic management.

One final recommendation, made by the author is that the methodology used in this audit should also be reviewed to determine the level and standards to which audits should be undertaken in the future. This will ensure that audits are financially sustainable and yet still fulfill the purpose for which they are carried out.

In conjunction with the preparation of this report, the audit team leaders (Messrs Boyson and Kaye) have been commissioned to produce interim audit procedures for future audits which would be available for all parties to use.

1. Introduction

This report has been produced as a summary of the 2 independent reports to Transfund New Zealand produced by the team leaders involved in the two surveys forming this audit.

The audit was commissioned following an initial audit (see Background below) to determine the level of compliance in terms of temporary traffic management arrangements or otherwise with the available standards by organisations working on New Zealand's road network.

The Terms of Reference controlling the audit are included in Appendix I.

Two independent surveys have been undertaken, one in the South Island and another in the North Island. These were reported separately as follows:

Report No. RA98/702S	Pilot Safety Audit of Traffic Control at Road Work Sites. Auckland North Area
Report No. RA98/703S	Pilot Safety Audit of Traffic Control at Road Work Sites North Canterbury Area

This report summarises those reports.

2. Glossary

The following abbreviations have been used in this report:

LTSA	Land Transport Safety Authority
Transit	Transit New Zealand
SDF	Site Danger Factor

3. Background

Concerns in regard to the level of compliance being achieved in the area of temporary traffic management were made known to Transfund New Zealand by David Parkes and Mike Gray of Capital Training Ltd in 1996. Subsequently a one day trial audit was commissioned to establish whether there was any basis to the opinions expressed.

Transfund Audit Report No.RA96/562S documents the results of the trial, and proposed some interim safety audit procedures.

It was found that none of the sites inspected fully met the standards available to be followed. As a result of this the two Transfund audits covered by this report were commissioned.

These audits follow a similar methodology to that developed for the trial audit carried out in 1997.

In conjunction with the above audits, the LTSA conducted their own independent audit of temporary traffic control as part of their annual 'theme' audit programme. This audit focused on the procedures in place for implementing traffic control at road work

sites as well as the inspections of actual sites. The results of the audit have been reported in LTSA report No. RSS8 'Traffic Standards and Guidelines 1998 Survey - Traffic Control at Roadworks'.

4. Standards used to Measure Compliance

The following documents were used assess each site's condition:

- Transit New Zealand specification for Temporary Traffic Control (G1 May 1996)
- Transit New Zealand publication 'Working on the Road May 1993'
- Transit New Zealand and LTSA Manual of Traffic Signs and Markings
- Traffic Regulations and Transport Act

5. Purpose

The purposes of these audits were to:

- To report to the Transfund New Zealand Board on the provision for road safety at roadwork sites
- To apply the draft procedures proposed in report RA96/562S so that they may be developed further, possibly for use as an operational tool by road controlling authorities.
- To provide an element of training on the job for team members
- To provide a complimentary audit to the LTSA theme audit for 1998 which covered temporary traffic control.

The purpose of this report is to provide summary information from the surveys forming the Transfund audit without identifying particular operations or organisations involved.

6. Methodology

6.1 Team

The audit team consisted of the following personnel:

North Island

Project Manager/Driver:	Ian Appleton	Transfund New Zealand
Team Leader/Recorder	John Boyson	John Boyson Consulting Services Ltd
Advisor/Site plans	David Parkes	Capital Training Ltd
LTSA representative/Video operator	David Croft	Land Transport Safety Authority

South Island

Project Manager/Driver:	Ian Appleton	Transfund New Zealand
Team Leader/ Video operator	Jeff Kaye	Opus International Consultants Ltd
Advisor/Site plans	David Parkes	Capital Training Ltd
LTSA representative/ Recorder	Antoni Facey	Land Transport Safety Authority

6.2 Procedure

The procedure followed was similar for the North and South Island surveys.

The team, once briefed, travelled together in a Toyota Previa. The vehicle was specifically selected to provide ample space in which to safely mount the video camera and give some extra height above the road for viewing the sites.

The sites were randomly selected by traveling along a predetermined route. No forewarning of the audit was given as the intent was to establish the level of compliance being achieved in a 'normal' situation.

Once a site had been located, an initial drive through was undertaken to establish its extent. Following this the site was traversed along all possible routes in all available directions. During this drive over the site was filmed to provide a historical record.

Following the drive over, a sketch plan was drafted. In addition a questionnaire was completed detailing specific levels of compliance for specific areas. Finally an estimate of the 'site danger factor' was calculated from those areas of non compliance identified. Examples of the forms used are located in Appendix II to the rear of this document.

One point the audit team considered was the need to inspect sites at night. Whilst they considered that this was desirable it was agreed that for the purposes of this audit it was impractical. However it was also agreed that this was an area that may require further action possibly as a follow up to this audit.

6.3 Site Danger Factor Calculation and Site Classification

The form detailing the procedure for calculating the 'Site Danger Factor' (SDF) for each site is included in Appendix II. In accordance with the approved terms of reference, included in Appendix I, each site was accorded one of the following categories depending upon the outcome of the SDF calculation.

SDF = 0	**SAFE**	Full compliance with standards in force - no further action necessary
SDF = 1 - 1000	**MARGINAL**	Deficiencies should be noted for future correction.
SDF = 1000 - 2000	**SERIOUS**	Deficiencies should be remedied without delay

SDF = 2000 +	**DANGEROUS**	Work should cease immediately and site should be made safe. Work should only recommence when it can be guaranteed that work will be completed to required standards

It is important to note that the above categories are taken directly from the procedures outlined report RA96/562S covering the trial audit. They have now been replaced by the interim 'site hazard rating' procedures developed in conjunction with the production of this report.

6.4 Location

The South Island survey was conducted in the Northern Canterbury Region whilst the North Island survey took place to the north of Auckland. The routes followed were devised to include a balance of Local Road and State Highway in both urban and rural environments.

6.5 Safety

The audit team's own safety was a primary concern. Since no warning of the audit could be given, no external visual indication of the vehicle's purpose was displayed. Accordingly the vehicle was driven at all times in the manner of a normal road user.

In general there was no requirement for anyone to leave the vehicle. In exceptional circumstances when a team member did step outside the vehicle, an appropriate high visibility jacket was worn.

At no time during the site inspection were any of the site personnel contacted or disturbed from their duties.

6.6 Reporting

Example records of the site inspection forms are included in Appendix II.

Each Team Leader was free to report the results in whatever format he considered to be most appropriate using the initial report of 29 January 1997 as a basis. Examples of which are set out in Appendix III, showing a sample from sites of each category except satisfactory of which none were found in either survey.

Both team leaders elected to show sites as inspected, as they considered the diagrams should be consistent with the principles adopted in the initial survey report.

The reports differ in that the South Island report details particular discrepancies for each site accompanied by still photographs, whilst the North Island report identifies the areas of non compliance through the inclusion of the calculation figures for the site danger factors.

It is the author's opinion that both approaches may have value in future audit reports depending upon the purpose of the report.

7. Results

South Island

In all 31 sites were inspected. The spread of site danger factors calculated were as follows:

Site No.	Work Type	Urban /Rural	Site Danger Factor	Category
2	Trenching in footpath	U	15	
7	Footpath Repairs	U	15	
21	Road Inspection	U	25	
22	Completed Chip Seal	R	45	
18	Tree Felling	R	50	
9	Unattended Reseal Site	U	75	
13	Completed Chip Seal	U	125	**Marginal**
16	Hedge Trimming	R	150	
19	Chip Seal	R	500	
15	Completed Chip Seal	U	625	
26	Drive and Drain Construction	U	925	
4	Intersection Upgrade	U	1000	
20	Reconstruction	R	1000	
31	Roundabout Construction	U	1250	
23	Unattended Drainage Works	U	1375	
3	Trenching in road	U	1500	**Serious**
12	Roadmarking	R	1500	
30	Linework	U	1625	
17	Completed Chip Seal	U	2000	
25	Footpath Repairs	U	2250	
6	Watermain Repairs	U	2250	
28	Footpath Construction	U	2250	
24	Footpath/Driveway Sealing	U	2500	
14	Chip Seal - Active	U	2750	
8	Asphalt Milling/ Patch Repairs	U	3000	**Dangerous**
29	Roundabout Reconstruction	U	3500	
10	Asphalt Patch Repairs	U	3700	
27	Entrance Construction	R	4000	
5	Road Reconstruction	U	5500	
1	Footpath Works	U	6000	
11	Road Reconstruction	R	6700	

North Island

In all 28 sites were inspected as follows:

Site No.	Work Type	Urban /Rural	Site Danger Factor	Category
17	A sign	R	5	
9	A sign	U	50	
1	Footpath Repairs	U	125	
11	Slip Protection	R	150	**Marginal**
7	Bridge Construction	R	470	
10	Slip Protection	R	500	
20	A parked van	U	500	
14	Reseal	U	1000	
15	Reseal	U	1000	**Serious**
25	Pedestrian Crossing Repairs	U	1250	
24	Road Reconstruction	U	1350	
5	Road Reconstruction	U	2100	
8	Road Reconstruction	R	2100	
23	Grass Cutting	U	3000	
18	Road Reconstruction	U	3450	
3	Surveying	U	3500	
4	Pipeline installation	U	4000	
21	Traffic Signal Repairs	U	4000	
12	Roadmarking	U/R	5000	
2	Footpath Repairs	U	5000	**Dangerous**
27	Drainage work	R	5200	
6	Road Reconstruction	U	5500	
13	Slip Repair	R	5700	
16	Drainage work	U	6000	
22	Resurfacing	U	6000	
26	Road Reconstruction	R	6700	
28	Road Reconstruction	R	13800	
19	Road Reconstruction	R	14800	

NB Where footpath works are noted in cases these involved activities which affected the adjoining road users in some way.

Example detail results of the above site inspections can be found in Appendix III